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ABSTRACT

The booklet describes Wisconsin's hearing conservation program designed to identify children with impaired hearing, provide diagnostic otologic examinations and evaluations for students with significant losses, provide medical care and educational intervention, and encourage local communities to continue hearing conservation programs. Statistics on the program (related to staff time and identification and followup services) are followed by examples of diagnosis from otologic clinic examinations. The remainder of the guide offers specific suggestions about hearing tests, including information on audiometer nomenclature and performance checks, screening criteria, precautions, post-screening procedures, use of tympanometry, and referral suggestions. Resources in the state for additional help are listed. (CL)

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WISCONSIN HEARING CONSERVATION PROGRAM

A Guide for Nurses, Parents, School Personnel, Physicians

Wisconsin Department of Public Instruction
Herbert J. Grover, Ph.D.

EC 162177

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The Department of Public Instruction does not discriminate on the basis of race, sex, age, religion, handicap, or national origin.

The Division for Handicapped Children and Pupil Services, Bureau for Children with Physical Needs (BCPN) takes this opportunity to thank volunteers who have given audiometric screen tests to almost 6,500,000 Wisconsin boys and girls since 1947.

The Bureau's program of hearing conservation was established to locate children with impaired hearing; to provide diagnostic otologic examinations and evaluations for boys and girls found to have significant hearing losses; to correct and rehabilitate whenever possible through medical and surgical care and exceptional education; and to encourage local communities to continue hearing conservation programs. This service is especially concerned with those children who have enough residual hearing for regular classroom attendance provided they are given special consideration in preferential seating, speech therapy, speech reading, auditory training and/or amplification.

The program is financed through federal and matching state funds. It is sanctioned by the Department of Public Instruction and the state and local medical societies.

RATIONALE

Children of any age may have hearing problems. The majority of them are found between three and nine years of age. Nearly 5% of children screened during the school year are found to have some degree of ear involvement and most of those identified can be helped through medical intervention.

PURPOSE

1. Identifying children who have ear problems and/or hearing losses that may interfere with communication and education.

2. Provide followup care, such as medical and educational intervention, for those children identified.

STATISTICS

1. Of nearly 250,000 children screened each year, approximately 12,500 require followup and around one-third of these children are seen at otologic field clinics.

2. Approximately 70 clinic days are scheduled yearly and nearly 55 otologists participate in these clinics.

3. About 100 technicians used in local programs are trained by the Bureau for Children with Physical Needs (BCPN) audiologists and most are reimbursed through BCPN funds.

4. The Wisconsin Hearing Conservation audiologists offer their services to participating programs and assist all eligible children to obtain followup hearing services.

5. Audiometers are supplied by the BCPN for use in screening and threshold testing.

SOME DIAGNOSES FOUND IN OTOLOGIC CLINIC EXAMINATIONS

Losses of hearing - three classic types:

Conductive:	Loss is noticeable primarily in the lower tones. A child with a marked conductive loss may speak more softly than is necessary. Generally, conductive hearing losses can be corrected through medical treatment.
Sensori-Neural:	(nerve loss) Loss is noticeable primarily in the higher frequencies. A child with a marked perceptive impairment may speak more loudly than is necessary. A perceptive or nerve loss is permanent and cannot in most instances be aided to any great extent by medical treatment.
Mixed:	Loss is a combination of the other two types. Auditory acuity is best in the middle frequencies. Attempt is made to reverse the conductive factor through medical treatment.

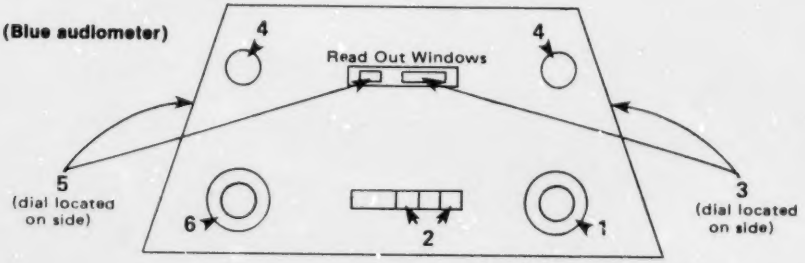
1. Infected tonsils and adenoids (or tonsils tags and adenoids).
2. Enlarged adenoids (including lymphoid hyperplasia).
3. (Eustachian) tube obstruction (tube leading from throat to middle ear cavity).
4. Nasal Pathology: Allergies, sinusitis, deviated nasal septum, nasal polyps.

5. Ear Pathology: Impacted cerumen (wax), chronic otitis media (infection, fluid, pressure, etc.), aural polyps (growths in nose), chronic adhesive otitis media (advanced stages of chronic otitis media), perforated tympanic membrance (hole in eardrum), cholesteatoma (tumor in middle ear), malfunction of ossicular chain (three bones in middle ear which assist in transmitting sound to inner ear and brain).

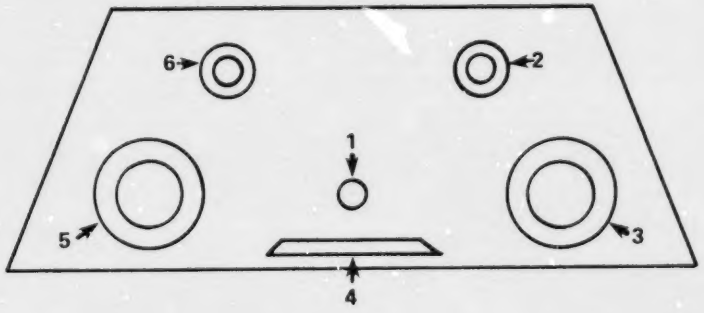
AUDIOMETER NOMENCLATURE

1. Off/On Switch.
2. Right or left ear. Do not use in group position.
3. Frequency dial. The higher the number, the higher the pitch or tone. The lower the number the lower the tone or pitch.
4. Interrupter. Press down, tone is on. Release, tone is off.
5. Intensity/Loudness. The higher the number, the louder the tone.
6. Norm On/Off. Must be in Norm Off position for black audiometer. Must be in Tone Off position for blue audiometer.

(Blue audiometer)



(Black audiometer)



AUDIOMETER PERFORMANCE CHECK:
(Prior to each day's Testing)

1. Place headphones on head - red on right ear, blue on left ear.
2. Be sure opening in receiver is directly opposite the ear canal.
3. Set intensity dial at 40 dB.
4. Set frequency dial at 1,000 Hz.
5. Set ear selector on Red - right.
6. Depress tone bar for tone.
7. Move wire at base of headphone slowly to check for possible interruption in tone. (interruption indicates broken cord.)
8. Switch to left ear and repeat procedure.
9. Set intensity dial at 20 dB. Assuming you have normal hearing, listen for 1,000 Hz, 2,000 Hz, and 4,000 Hz in each ear. You should hear tones easily in a quiet room. If tones cannot be heard, room is not adequate for testing.
10. If one earphone is not working, use other phone by switching manually and continue testing. Notify nurse at end of day of the problem. Under no circumstance switch headphones from one audiometer to another.
11. If audiometer cannot be used at all, contact the nurse immediately and she will supply another audiometer.

TECHNIQUES FOR GIVING HEARING TEST (Demonstration)

It is imperative that the child understand what he/she is to do and for what he/she is listening.

1. Set intensity dial at 110 dB. Set frequency dial at 2,000 Hz.
2. Hold headphones in front of the child (or group) and present tones.
3. Instruct child(ren) to raise his/her arm when the sound is heard.
4. Present tone. Raise arm along with child(ren).
5. Decrease intensity to 90 dB. Instruct child(ren) that the tone will seem farther away but the arm should still be raised.
6. Decrease intensity to 70 dB. Again, instruct child(ren) to raise the arm even though sound seems still farther away. (Tell child(ren); "You may not hear every tone").

CRITERIA FOR SCREENING

1. While BCPN may only reimburse technicians to test certain grade levels, we urge screening at the younger age levels (pre K, K, 1, 2, and 3) as well as children in special classes and others suspected for hearing loss. Procedures for screening pre-kindergarten children may vary slightly from school age children and will require more skills as well as other screening tools - (see Tympanometry.)
2. The frequencies 1,000 Hz, 2,000 Hz, and 4,000 Hz will be used.
3. The intensity dial will be set at 20 dB.
4. The child must respond two times at each frequency (both ears) in order to pass the test. NOTE: If there is no response at 4,000 Hz only, the hearing level will be raised to 25 dB. If he/she still does not respond, he/she will then fail the test.
5. Any child failing the first screening will be screened again by another screener. If you are the only one testing, then have the child wait in line and observe two or three other children being tested. Test again, following the procedure above.

When the child is ready for testing:

1. Expand headband and place red phone on right ear, blue phone on left.
2. Tester should make certain that the opening in center of the earphone is in direct line with the ear canal and therefore, should place the headphones on the child while facing him.
3. Adjust earphones to approximate size of head before placing in position. Headband should rest squarely in center of head.
4. Child should be seated facing about 45 degrees away from the tester in order for tester to observe child's reactions.
5. Have child place hand on knee in readiness for responses. He should, again, be told to raise his hand high when he hears a tone; to keep it up as long as he hears it and return the hand to the knee when the tone is gone.
6. Start with an approximate two-second tone presentation in the right ear at 1,000 Hz. If he/she raises the arm, cease tone presentation and allow child to return hand to the knee. Present tone a second time and, again, allow him to return hand to the knee. He must respond two times at each frequency to pass the test. If the child responds once, keeping in mind he must respond two times, present the tone a second time. If he does not respond, present the tone a third time but no more than four times. Again, child must raise the arm two times for each frequency in order to pass the test.
7. Proceed to 2,000 Hz, 4,000 Hz, and then repeat entire sequence for the left ear.
8. NOTE: If child does not hear at 4,000 Hz at 20 dB, raise intensity to 25 dB and present tone. If child raises arm two times at this setting, he will be considered to have heard this tone. Return the intensity to 20 dB prior to testing another child.

9. Do not develop a rhythmic presentation. It is suggested that you break the routine so the child is never sure when the tone will be forthcoming.
10. If the child fails, he is to be rescreened by another tester immediately, if possible, or by the same tester after a short rest period. Carefully, reinstruct before rescreening.
11. Record the frequency or frequencies missed on the class sheet provided you. Also indicate the date of screening.
12. If the child passes, he is told, "Your hearing is fine today." If he fails the second screening, he is told "We're not sure about your hearing today. You will be given another hearing test within the next week."
13. Follow instructions and schedule provided by your nurse in regard to class sheets and transfer of audiometers.

PRECAUTION

1. A quiet room is absolutely essential. Listen to the audiometer tones yourself. Assuming that you have normal hearing, you should be able to hear each frequency with ease, at the screening level (20 db). DO NOT TEST IF YOU CANNOT HEAR THE TONES UNDER PHONES.
2. You will not be able to test some children. Some will give false or no responses. Spend enough time to test each child carefully. The average test will take about one to two minutes.
3. For larger heads, make certain headband is fully extended to assure proper fit. This should be done before placing headset on the head. Smaller heads may require padding under the headband to lift phones into alignment with ear canals.

PROCEDURE FOLLOWING SCREENING

1. Those children who fail the screening will be given a more detailed (threshold) test by someone trained by the BCPN audiologist.
2. Results of the threshold tests are routed by the nurse to the BCPN audiologist.
3. The audiologist selects those children to be seen for medical followup and/or otologic field clinic.

4. The nurse then invites the child and parent to attend the field clinic. (Those children who have a history of ear problems or seem acutely ill are referred to their physician immediately.)
5. Otologic field clinics may be made available depending upon number of children scheduled.
6. An otologist (ear doctor) will examine the child to determine the cause of the hearing problem.
7. The parent is then told the nature of the problem and what can be done to correct it.
8. A written report is sent ot the family physician, the nurse, and the school.
9. Financial assistance is available through the BCPN for those families in need. This assistance may cover further evaluations, medical intervention, and purchase of hearing aids. The BCPN assists in the purchase of approximately 400 hearing aids annually.

TYMPANOMETRY

If you have access to necessary equipment and plan to utilize tympanometry in screening children age 3-5, we urge the following:

1. Person or persons involved in screening be properly trained and supervised by a clinical audiologist.
2. Pure tone screening and/or hearing history be included with tympanometry.
3. Failure of any or all procedures will require a retest in 4-6 weeks before referral.

REFERRAL CRITERIA

1. Refer all acutely ill children immediately.
2. If a child has a flat tympanogram and a mild pure tone loss (25 dB average on a threshold test) he/she should be given consideration for immediate medical referral.
3. If a child has a recent history of ear pathology and a flat tympanogram he/she should be given consideration for immediate medical referral.
4. If a child has a flat tympanogram and no other indicators, rescreen in 4 weeks. If the tympanogram is still flat, refer.

5. Public health personnel should also use clinical judgment to refer or withhold referral.
6. Retest in 4 weeks all children with normal middle ear mobility (normal curve) but who have a – 200 or + 100 air pressure. Continue to monitor as necessary. NEVER refer on these results alone. Refer if history or threshold audiogram indicates need.
7. Identify children who may be candidates for audiological referral. These will typically be children who have normal tympanograms but fail Pure Tone Threshold Tests.

GENERAL INFORMATION

No child is too young to be tested for hearing acuity. In an effort to identify children with special needs at a very early age, a number of hospitals and private facilities throughout the state have begun to screen for hearing impairments as early as 6 months of age. Those children who fail these hearing screening tests are referred to clinical audiology centers for further evaluations, and if indicated, for the fitting of hearing aid amplification. Outreach programs for identified hearing impaired children are also being developed throughout the state. It should be possible for these children to obtain the language stimulation so necessary during the developmental years prior to entry into school.

Contact the Division for Handicapped Children & Pupil Services Regarding:

*Classes for Hearing Impaired	(608) 266-7097
*School for the Deaf	(414) 728-2677
*Early Childhood/Exceptional Educational Needs	(608) 267-9172
*TTY Access	(608) 266-8143

Other resources available to hearing impaired children and adults are:

- Muliply handicapped/hearing impaired children needing services other than for hearing problems should be referred to a Nursing Specialist in the Bureau for Children with Physical Needs, 125 South Webster, P.O. Box 7841, Madison, WI 53707. Phone number is (608) 266-3726.

- Personnel are available to work with deaf and hearing impaired adults throughout the state. Interpreters are also available through the Bureau for Hearing Impaired, Herb Pickell, Director, 1 West Wilson Street, Madison, WI 53702. Phone number is (608) 266-8081.

Otologists (ear doctors) are located in or near most counties in the state. Consult with your family physician regarding referral if necessary. The BCPN also maintains an up-to-date listing of participating otologists in the Wisconsin Hearing Conservation Program.

There are 38 speech and hearing centers located within the state - see the following listing. Complete hearing and hearing aid evaluations are available by clinically certified audiologists.

Speech and Hearing Centers	Classes for the Hearing Impaired
Appleton	Antigo
Ashland	Germantown
Beloit	Green Bay
Chippewa Falls	Kenosha
Delavan	LaCrosse
Eau Claire	Madison
Fond du Lac	Milwaukee
Green Bay	Oshkosh
Janesville	Racine
Kenosha	River Falls
LaCrosse	Sheboygan
Madison	Shorewood
Manitowoc	Stevens Point
Marshfield	Superior
Menomonie	Wausau
Menomonee Falls	Wauwatosa
Mequon	Whitefish Bay
Milwaukee	Waukesha County
Monroe	CESA #1
Neenah	CESA #2 (Minocqua) Phillips

(Continued)

Oconomowoc
Oshkosh
Portage
Racine
Rice Lake
River Falls
Sheboygan
Stevens Point
Superior
Watertown
Waukesha
Wausau
Whitewater
Wisconsin Rapids
Woodruff

CESA #4 (Cumberland) Cameron
CESA #5 (Elmwood)
CESA #6 (Chippewa Falls)
CESA #9 (Sturgeon Bay)
CESA #11 (Onalaska)
CESA #12 (Portage)
CESA #13 (Waupun)
CESA #14 (Fennimore
Wisconsin School for the Deaf
(Delavan)
Deaf/Blind
Milwaukee
Oshkosh
Racine

Out of State
Dubuque, Iowa
Duluth, Minnesota
Minneapolis, Minnesota
Rockford, Illinois
St. Paul, Minnesota

BCPN audiologists responsible for preschool and school-age programs may be reached by calling:

Raymond Wahlton	(608) 267-9188
Orvin Walsvik	(608) 266-3890

Douglas
Bayfield
Iron
Ashland
Vilas
Burnett
Wash-
burn
Sawyer
Price
Oneida
Florence
Forest
Marinette
Polk
Barron
Rusk
RAYMOND WAHLTON
Lincoln
Langlade
Taylor
St. Croix
Dunn
Chippewa
Menomi-
nee
Oconto
Clark
Marathon
Shawano
Pierce
Eau Claire
Pepin
Door
Buffalo
Trem-
pealeau
Wood
Portage
Waupaca
Outagamie
Brown
Jackson
Adams
Waushara
Winne-
bago
Manitowoc
LaCrosse
Monroe
Mar-
quette
Green
Lake
Fond du Lac
Shaboygan
Juneau
Vernon
Richland
Sauk
Columbia
Dodge
Wash-
ington
Ozaukee
ORVIN WALSVIK
Crawford
Grant
Iowa
Dane
Jefferson
Waukesha
Milwaukee
La Fayette
Green
Rock
Walworth
Racine
Kenosha

- NOTES -